

* NOTICES *

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application]This invention relates to the method of manufacturing a copper sulfate solution simple from metallic copper powder.

[0002]

[Description of the Prior Art]Metallic copper powder is roasted, and the general method of manufacturing a copper sulfate solution from metallic copper powder considers it as copper oxide powder, and dissolves this in sulfuric acid. It is for this to require the oxidizing power by heat concentrated sulfuric acid for dissolving metallic copper with sulfuric acid directly, and for expense to start safe upper equipment too much, for performing this lytic reaction on a large scale.

[0003]Although a rotary kiln etc. can be used for manufacture of copper oxide powder, The equipment which dissolves the copper oxide powder obtained by it taking about 5 hours to process 500 kg of metallic copper powder is also independently required of the roast temperature of about 600 **, and although total cost is low compared with a heat concentrated-sulfuric-acid dissolution method, there are many technical problems, such as saving of fuel cost and shortening of roast time.

[0004]

[Problem(s) to be Solved by the Invention]In light of the above-mentioned circumstances, this invention is a thing.

Without going, the purpose is low cost safely about a copper sulfate solution directly from metallic copper powder, and is providing the method of moreover manufacturing in a short time.

[0005]

[Means for Solving the Problem]Sulfuric acid is added maintaining this liquid at 65 thru/or 85 **, while a method of this invention introduces a bubble of detailed air into

suspension of metallic copper powder so much, in order to attain the above-mentioned purpose, and the feature is that it carries out oxidizing melting of the metallic copper.

[0006]

[Function]40 thru/or 120 meshes are suitable for the particle size of metallic copper powder. A dissolution rate becomes quick so that a particle size is small, but will deal with it, if a particle size is not much small, and are easy to become dust in inside, and work environment is got worse, and also it is hard to make suspension.

[0007]In order to introduce the bubble of detailed air so much, the dissolver provided with the agitator which takes in air at a self-priming ceremony from the air-intake in the upper part of an agitator, and is discharged [be / it / under / of a shaft / passing] from the tip of wings is suitable. Detailed air foam works to oxidation of metallic copper powder very effectively, and completes oxidizing melting comparatively for a short time.

[0008]The bubble of air becomes small, and oxidation efficiency becomes good so that the diameter of an air exhaust port is small, but since there is also a possibility of blockading with the garbage in the air, etc. when not much small, it is practical to be referred to as 5 thru/or about 10 mm.

[0009]After the inversion rate from metallic copper to copper sulfate reaches to 99%, it is useless to raise number of rotations more, and what is necessary is for a bubble to become detailed and for dissolution efficiency to rise so that the number of rotations of an impeller is large, but just to ask for the optimal number of rotations experimentally. According to the experiment, 100 thru/or 125r.p.m. can also call it suitable number of rotations.

[0010]For said inversion rate, solution temperature is also important and he is high Aritoshi Tei. However, since the corrosion of the environmental deterioration by evaporation of liquid and a device is caused, it is a range with suitable 65 thru/or 85 ** undesirably to raise temperature not much.

[0011]It is good to be better than performing addition of sulfuric acid at once to add according to oxidation reaction, and to add requirements gradually over about 1 hour.

[0012]If metallic-copper-powder suspension is processed by such a method, a copper sulfate solution can be obtained with not less than 99% of an inversion rate in about 3 hours, and, also in energy and in time, it is more advantageous than a conventional method.

[0013]

[Example]

The industrial water 920l is put into the dissolving device which has a tub with a jacket of experiment No.1--1.5-m³ capacity, and an air self-priming type agitator, After investing 125 kg of metallic copper powder whose particle size is 40 thru/or 60 meshes and making it suspended, the number of rotations of the agitator was made into 125r.p.m., and 225 kg of concentrated sulfuric acid was added over about 1 hour 98%.

Solution temperature was maintained at 70 °C in the meantime, and churning was continued for further 2 hours. The inversion rate to copper sulfate was 99.2%.

[0014]Experiment No.2 -- to the device of capacity 10 m^3 of 12 m which enlarged the dissolving device of experiment No.1. Solution 10 m^3 containing 18 g/l of arsenic, 30 g/l of copper, and 90 g/l of sulfuric acid is put in, Invest in this 500 kg of metallic copper powder whose particle size is 80 thru/or 120 meshes, it was made suspended to it, the agitating speed was made into 100r.p.m., 287 kg of concentrated sulfuric acid was added 98% in about 2 hours, and churning was continued for further 1 hour, maintaining solution temperature among 75 thru/or 80 °C in the meantime. The inversion rate to copper sulfate of metallic copper powder was 99.0%.

[0015]

[Effect of the Invention]Moreover, a copper sulfate solution can be directly manufactured now by safety and low cost from metallic copper powder by this invention in a short time.

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CLAIMS

[Claim(s)]

[Claim 1]A manufacturing method of a copper sulfate solution adding sulfuric acid, maintaining this liquid at 65 thru/or 85 ** introducing a bubble of detailed air into metallic-copper-powder suspension so much, and carrying out oxidizing melting of the metallic copper.

[Translation done.]